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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,734	12/02/2003	Hideo Kaneko	0171-1045P	2079

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EXAMINER

ROSASCO, STEPHEN D

ART UNIT PAPER NUMBER

1756

DATE MAILED: 07/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/724,734

Applicant(s)

KANEKO ET AL.

Examiner

Stephen Rosasco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 13-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 13-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Detailed Action

In response to the RCE and Amendment of 6/01/06, wherein claims 19-24 were added, the examiner withdraws the previous office action rejections and includes new ones here.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e) as being clearly anticipated by Yoo (6,376,806).

Yoo teaches a method for rapid thermal processing of a substrate, said method comprising: providing a chamber including a radiation energy source and a reflector; raising the power level of said radiation energy source to a peak power level to expose an active layer of a substrate to a first radiation energy for a first substantially instantaneous time duration; and thereafter maintaining a second power level of said radiation energy source, less than said first power level, to expose a bulk of said substrate to a second radiation energy for a second time duration, said first time duration being between about 1 nanosecond and about 10 seconds and said second time duration being between about zero seconds and about 3600 seconds.

And wherein said radiation energy source comprises a high-intensity lamp.

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And wherein said radiation energy comprises an average power of between about 0.5 J/cm.² and about 100 J/cm.².

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 and 13-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nozawa (6,746,806) in view of Nozawa et al. (6,677,087) and Yoo (6,376,806) or Ito (6,770,519).

The claimed invention is directed to a method for manufacturing a photomask blank having a film of at least one layer formed on a substrate, comprising the steps of forming a film on a substrate, and irradiating the film with light from a flash lamp.

And wherein the step of forming a film on a substrate includes sputtering.

And wherein the film is a phase shift film, which contains silicon, at least one metal other than silicon, and at least one element selected from the group consisting of oxygen, carbon and nitrogen.

The applicant discusses the limitations of the prior art in that phase shift masks are manufactured by lithographically patterning phase shift mask blanks, which involves the step of applying a resist onto a phase shift mask blank, irradiating selected portions of the resist with electron beams or ultraviolet radiation, developing the resist, and etching

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desired portions of the phase shift film. Thereafter, the resist film is stripped, leaving a phase shift mask.

In a photomask blank like the mask blank discussed above, a film like the phase shift film is generally formed on a substrate by sputtering. Stresses are induced in the film, by which the substrate is distorted. The resulting photomask blank is thus warped. If a photomask is manufactured through patterning of such a photomask blank, the warpage of the substrate is locally resumed to the original state prior to film formation because the film is partially removed by patterning. The resulting substrate has varying degrees of flatness. These changes introduce positional shifts between the mask blank during the pattern exposure and the actually finished mask. Such positional shifts have a larger influence as the mask pattern becomes finer, and the warpage sometimes cause focal shifts.

The claimed invention is directed to providing a method for manufacturing a photomask blank of quality having minimized warpage and improved chemical resistance and a method for manufacturing a photomask therefrom.

The applicant states that they have found that by forming a film on a transparent substrate and irradiating the film with light from a flash lamp, the resulting photomask blank is minimized in warpage and the film is improved in chemical resistance. Preferably the film is formed by sputtering. The film preferably has a lower light transmittance than the substrate. Typically, the film is a phase shift film which contains silicon, at least one metal other than silicon, and at least one element selected from among oxygen, carbon and nitrogen.

Nozawa teaches (see claims) a method of manufacturing a lithography mask blank on a glass substrate, comprising the steps of: depositing, on the glass substrate, at least one light absorption film which has a property of absorbing a laser beam of a predetermined wavelength which transmits the glass substrate; and irradiating the laser beam of the predetermined wavelength onto the light absorption film to selectively heat the light absorption film and to thereby alleviate its internal stress.

And wherein the step of irradiating comprises heating the light absorption film for a period on the order of several tens of nanoseconds.

And wherein the step of irradiating comprises heating the light absorption film to a temperature of at least 1000 degree C.

And wherein the light absorption film comprises MoSiN.

Nozawa also teaches (col. 4, lines 1-12) the light absorption film alone is selectively heated by irradiating the laser beam and the resultant transparent substrate is not damaged by the laser irradiation. This makes it possible to sufficiently strengthen the intensity of the laser beam and to sufficiently suppress the internal stress, such as the compressive stress, of the film that may be used for forming a circuit pattern, when the film is formed by the light absorption film. In addition, the internal stress is largely improved in this invention as compared with the conventional heat processing method. This is because the heat treatment is carried out at the temperature which is as high as 1000 degree C and which can not be accomplished in the conventional heating apparatus.

The teachings of Nozawa differ from those of the applicant in that the applicant teaches a specific energy level and duration of exposure and the use of a MoSiON phase shift film.

Nozawa et al. teach the use of molybdenum silicide oxynitride as a phase shift layer in a mask blank.

Yoo teaches a method for rapid thermal processing of a substrate, said method comprising: providing a chamber including a radiation energy source and a reflector; raising the power level of said radiation energy source to a peak power level to expose an active layer of a substrate to a first radiation energy for a first substantially instantaneous time duration; and thereafter maintaining a second power level of said radiation energy source, less than said first power level, to expose a bulk of said substrate to a second radiation energy for a second time duration, said first time duration being between about 1 nanosecond and about 10 seconds and said second time duration being between about zero seconds and about 3600 seconds.

And wherein said radiation energy source comprises a high-intensity lamp.

And wherein said radiation energy comprises an average power of between about 0.5 J/cm.² and about 100 J/cm.².

Ito et al. teach a method (see claims) for treating a semiconductor surface wherein a second heat treatment is implemented using a light source capable of adjusting the irradiation time to be 100 ms or shorter, with a light source is a xenon flash lamp having a 10 to 60 J/cm.² of irradiation energy density is used in the second heat treatment.

And wherein the irradiation time of the xenon flash lamp is 10 ms or shorter.

It would have been obvious to one having ordinary skill in the art to take the teachings of Nozawa and combine them with the teachings of Yoo or Ito in order to make

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the claimed invention because the secondary references teach the energy levels that are effective on these similar surfaces and were chosen by the applicant.

Applicant's arguments with respect to claims 1-6 and 13-18 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, sweeping flourish extending from the end of the name.

S. Rosasco
Primary Examiner
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S. Rosasco
7/06/06